# RISDON IRON AND LOCOMOTIVE WORKS *v.* MEDART.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE NORTHERN DISTRICT OF CALIFORNIA.

No. 164. Submitted January 21, 1895. — Decided April 22, 1895.

Processes of manufacture which involve chemical or other similar elemental action are patentable, though mechanism may be necessary in the application or carrying out of the process, while those which consist solely in the operation of a machine are not; and where such mechanism is subsidiary to the chemical action, the fact that the patentee may be entitled to a patent upon his mechanism does not impair his right to a patent for the process.

A valid patent cannot be obtained for a process which involves nothing more than the operation of a piece of mechanism, that is to say, for the function of a machine.

A patent only for superior workmanship is invalid.

If it appears, upon demurrer to a bill to restrain infringement of letters patent, that the patent is invalid, the bill should be sustained.

Letters patent No. 248,599, granted October 25, 1881, to Philip Medart for the manufacture of belt pulleys, and letters patent No. 248,598, granted October 25, 1881, to him for a belt pulley, and letters patent No. 238,702, granted to him March 8, 1881, for a belt pulley, are all invalid.

THIS was a suit in equity instituted by Philip and William Medart against the appellant, for the infringement of three letters patent granted to Philip Medart, viz.: Patent No. 248,599, dated October 25, 1881, for the manufacture of belt pulleys; patent No. 248,598, also dated October 25, 1881, for a belt pulley; and patent No. 238,702, granted March 8, 1881, also for a belt pulley.

In the first patent, No. 248,599, the patentee stated in his specification that his invention "relates to that class of belt pulleys formed of a wrought-metal rim and a separate centre, usually a spider, and usually made of cast metal. Heretofore considerable difficulty has been encountered in the manufacture of such pulleys, much time, skilled labor, and large and elaborate machinery have been required, and

their production has been correspondingly expensive. The object of my invention is to cheapen and simplify their construction, overcome the objections above mentioned, and produce strong and perfect pulleys in a quick and efficient manner. My invention, therefore, consists in an improved process of manufacture, whereby the above results are obtained."

The drawings accompanying the specification represent the machinery for carrying out the invention, and the pulley at various stages of its manufacture. The specification sets forth in detail the manner in which the machinery is operated, and winds up with the following statement: "Pulleys thus manufactured are perfectly balanced, faultless in shape, strong and durable, and can be produced more rapidly and at less expense than the imperfect pulleys heretofore made. The machinery herein shown and referred to has not been described more in detail, as its operation will be clear to those skilled in such matters; and no claim to it is herein made, it being my purpose to secure protection for such apparatus by other applications hereafter to be made."

The claims, which are four in number, are all for the described improvement in the art of manufacturing belt pulleys, which consist in centering the pulley centre or spider and then grinding the same concentrically with the axis of the pulley, the several claims stating with more or less detail the principal steps in the manufacture.

In his specification to patent No. 248,598 the patentee states that his "improved pulley belongs to that class of pulleys composed of a separate spider, usually of cast metal, and a wrought-metal rim, which is secured to the spider;" and that his invention "consists in a pulley which is perfectly true and accurately balanced, that is, a pulley in which the centre of gravity and geometrical centre or axis coincide."

In his specification to patent No. 238,702, which was granted about seven months before the other patents, the patentee states that his invention "relates to certain improvements in belt pulleys and had for its object, first, the production of a cheap, light, and durable pulley; and, secondly, the production of irregular sizes of pulleys without the necessity

of a separate pattern for each size of pulley required; and this invention consists, first, in constructing the usual crown or dish on the rim of wrought-metal rimmed pulleys by bending said rim transversely during the process of manufacture; secondly, the belt pulley having arms formed of wood, preferably of a cylindical shape, which at their inner ends rest in sockets cast on the hub, and at their outer ends are provided with bracket lugs, to which the pin is secured by rivets or other equivalent means."

Figure 1 of the following drawings exhibits a perspective view, and figure 2 a vertical section of the patented pulley.

FIG. 2.

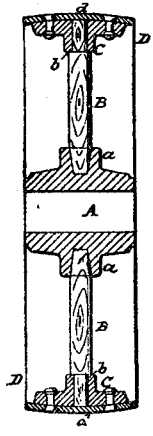
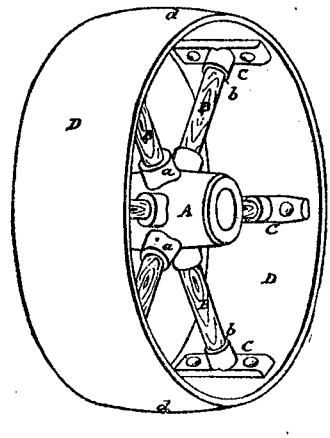



FIG. 1.




The defendant appeared and demurred to the bill upon the ground that the patents did not show invention upon their faces. The demurrer was argued and overruled and leave given to answer, and upon a subsequent hearing upon pleadings and proofs it was adjudged that all of the patents were valid; that the defendant had infringed the first, second, and third claims of patent No. 248,599, the two claims of patent No. 248,598, and the first claim of patent No. 238,702, and defendant was enjoined from further infringing. A final decree was subsequently entered, upon the report of the master, for $1811.25, from which decree the defendant appealed.

*Mr. M. A. Wheaton*, *Mr. F. J. Kierce*, and *Mr. E. R. Taylor* for appellant.

*Mr. William M. Eccles* for appellees.

Mr. Justice Brown, after stating the case, delivered the opinion of the court.

The three patents involved in this suit are for an improved belt pulley, and for the manufacture of the same. Each of them requires a separate consideration.

1. Patent No. 248,599 is for an improved process of manufacturing that class of belt pulleys formed of a wrought-metal rim and a separate centre, usually a spider, and usually made of cast metal. The drawings represent the machinery for carrying out the invention, and the pulley at the various stages of its manufacture. The process of manufacture is set forth in detail in the specification, and consists of the following steps: (1) centering the pulley centre or spider; (2) grinding the ends of the arms concentrically with the axis of the pulley; (3) boring the centre; (4) securing the rim to the spider; (5) grinding the face of the rim concentric with the axis of the pulley; (6) grinding or squaring the edges of the rim. This process, it may be observed, is purely a mechanical one.

Does it disclose a patentable invention? That the patent is for a process in manufacture, and not for the mechanism employed, nor for the finished product of such manufacture, is undeniable, and is so expressed upon the face of the specification.

The four claims of the patent make no reference to the mechanism exhibited in the drawings, and described in the specification. All claim an improvement in the art of manufacturing, and set forth in more or less detail the various steps in that process. That certain processes of manufacture are patentable is as clear as that certain others are not, but nowhere is the distinction between them accurately defined. There is somewhat of the same obscurity in the line of demarcation as in that between mechanical skill and invention, or in that between a

new article of manufacture, which is universally held to be patentable, and the function of a machine, which it is equally clear is not. It may be said in general that processes of manufacture which involve chemical or other similar elemental action are patentable, though mechanism may be necessary in the application or carrying out of such process, while those which consist solely in the operation of a machine are not. Most processes which have been held to be patentable require the aid of mechanism in their practical application, but where such mechanism is subsidiary to the chemical action, the fact that the patentee may be entitled to a patent upon his mechanism does not impair his right to a patent for the process; since he would lose the benefit of his real discovery, which might be applied in a dozen different ways, if he were not entitled to such patent. But, if the operation of his device be purely mechanical, no such considerations apply, since the function of the machine is entirely independent of any chemical or other similar action.

A review of some of the principal cases upon the subject of patents for processes may not be out of place in this connection, and will serve to illustrate the distinction between such as are and such as are not patentable.

The leading English cases are those which arose from the patent of September 11, 1828, to Neilson, for the improved application of air to produce heat in fires, forges, and furnaces, where bellows or other blowing apparatus were required. The patent, like many of the early English patents, contained no specific claims, but described a blast or current of air to be passed from the bellows into an air vessel or receptacle, made sufficiently strong to endure the blast, and artificially heated to a red heat, or very nearly so.

It was said that the air vessel or receptacle might be conveniently made of iron or other metals, and that its form was immaterial to its effect, and might be adapted to the local circumstances or situation. In *Neilson* v. *Harford*, 1 Webst. Pat. Cas. 331, this patent was construed by the Court of Exchequer, in which the claim was made that the patent was for a principle, and was, therefore, void. Great difficulty was felt in its proper

construction, but after full consideration it was held that the patent did not merely claim a principle, but a machine embodying a principle; and in delivering the opinion Baron Parke observed: "We think the case must be considered as if the principle being well known, the plaintiff had first invented a mode of applying it by a mechanical apparatus to furnaces; and his invention then consists in this by interposing a receptacle for heated air between the blowing apparatus and the furnace. In this receptacle he directs the air to be heated by the application of heat externally to the receptacle and thus he accomplishes the object of applying the blast, which was before of cold air, in a heated state in the furnace." In citing this case in support of his opinion in *O'Reilly* v. *Morse*, 15 How. 62, 115, Mr. Chief Justice Taney treated it as an invention of a mechanical apparatus by which a current of hot air, instead of cold, could be thrown in. "The interposition of a heated receptacle, in any form, was the novelty he invented."

The Neilson patent, however, subsequently came before the House of Lords on appeal from the Scottish Court of Session in the *Househill Coal and Iron Co.* v. *Neilson*, 1 Webst. Pat. Cas. 673. The case went off upon other questions, but in delivering his opinion Lord Campbell thought the patent should be taken as extending to all machines, of whatever construction, whereby the air was heated intermediately between the blowing apparatus and the blast furnace. "That being so, the learned judge was perfectly justified in telling the jury that it was unnecessary for them to compare one apparatus with another, because, confessedly, that system of conduit pipes was a mode of heating air by an intermediate vessel between the blowing apparatus and the blast furnace, and, therefore, it was an infraction of the patent." *S. C.* 2 Bell Scotch H. L. App. Cas. 1; 9 Cl. & Fin. 788.

So in delivering the opinion of this court in *Tilghman* v. *Proctor*, 102 U. S. 707, 724, Mr. Justice Bradley treated the Neilson patent as a patent for a process, although the patentee did not distinctly point out all the forms of apparatus by which the process might be applied. But, notwithstanding

the vast amount of litigation to which this patent gave rise, it can hardly be said that its proper construction has ever been definitely settled. Probably it was of no particular importance, as the air would have to be heated in a receptacle of some form before it was introduced into the furnace; and, therefore, if the patentee was not entitled to his patent as one for a process, he was clearly entitled to it as one for the only method of heating the air which was practicable — his patent not claiming any particular form of receptacle or any particular material of which it should be made.

The first case in this court in which a claim for a process received attentive consideration was the great case of *O'Reilly* v. *Morse*, 15 How. 62, 119, involving the validity of the patent to Morse for an electric telegraph. This patent contained eight claims, all of which, except the last, were for the machinery by which the electricity was transmitted and the message recorded. The eighth claim was for the use of the electric current as a motive power, however developed, for marking or printing intelligible characters at any distance. This claim was held to be too broad and not warranted by law, the court being of opinion that the allowance of such a claim would shut the door against the inventions of other persons, and enable the patentee to avail himself of any new discoveries in the properties and powers of electricity which scientific men might bring to light. In delivering the opinion of the court Mr. Chief Justice Taney observed: "Whoever discovers that a certain useful result will be produced in any art, machine, manufacture, or composition of matter, by the use of certain means, is entitled to a patent for it; provided he specifies the means he uses in a manner so full and exact that any one skilled in the science to which it appertains can, by using the means he specifies, without any addition to, or subtraction from them, produce precisely the result he describes. And if this cannot be done by the means he describes the patent is void. And if it can he done, then the patent confers on him the exclusive right to use the means he specifies to produce the result or effect he describes and nothing more. And it makes no difference, in this respect, whether the effect is produced by

chemical agency or combination; or by the application of discoveries or principles in natural philosophy known or unknown before his invention; or by machinery acting altogether upon mechanical principles. In either case he must describe the manner and process as above mentioned, and the end it accomplishes. And any one may lawfully accomplish the same end without infringing the patent, if he uses means substantially different from those described."

In view of some of our later decisions it may be questioned whether the language used by the Chief Justice in some portions of this paragraph may not be broader than these cases would justify, since patents for processes involving chemical effects or combinations have been repeatedly held to be valid. Thus in *Mowry* v. *Whitney*, 14 Wall. 620, a patent was sustained for an improved process for manufacturing cast-iron railroad wheels, by retarding their cooling by a second application of heat, until all parts of the wheel were raised to the same temperature, and then permitting the heat to subside gradually. So in *Cochrane* v. *Deener*, 94 U. S. 780, 787, 788, a patent to Cochrane for a process in manufacturing flour, which consisted in passing the ground meal through a series of bolting reels composed of cloth of progressively finer meshes, and at the same time subjecting the meal to blasts or currents of air, by which the superfine flour was separated and the impurities were so eliminated as to be capable of being reground and rebolted, so as to produce superfine flour, was held to be valid, and the patentee not limited to any special arrangement of machinery. In delivering the opinion of the court, Mr. Justice Bradley observed: "That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. . . . A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed, and reduced to a different state or thing. If new and useful, it is just as patentable as a piece of machinery. In the language of patent law, it is an art. The machinery pointed out as suitable to perform the process may or may not be new or patentable; whilst the process itself may be altogether new

and produce an entirely new result. The process requires that certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence." It will be observed in this case that the process for which the patent was sustained was not chemical in its nature, but, as stated in the opinion of the court, was a series of acts performed upon the subject-matter to be transformed and reduced to a different state or thing.

In *Tilghman* v. *Proctor*, 102 U. S. 707, a patent for a process for separating the component parts of fats and oils, so as to render them better adapted to the uses of the arts, or, as stated in the claim, "the manufacturing of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure," was sustained. The case of *O'Reilly* v. *Morse* was distinguished as not a patent for a process, but for a mere principle. "If the mode of doing it," said Mr. Justice Bradley, "or the apparatus in or by which it may be done, is sufficiently obvious to suggest itself to a person skilled in the particular art, it is enough, in the patent, to point out the process to be performed, without giving superogatory directions as to the apparatus or the method to be employed."

In *New Process Fermentation Company* v. *Maus*, 122 U. S. 413, a patent was sustained for preparing and preserving beer for the market, which consisted in holding it under controllable pressure of carbonic acid gas from the beginning of the kraeusen stage until such time as it is transferred to kegs and bunged. The process was strictly a chemical one, and was patentable within all the authorities upon the subject, although the mechanism by which the process was applied was also set forth in the patent.

Undoubtedly, the most important case in which a patent for process was considered was that of the *Bell Telephone*, 126 U. S. 1, 534, in which a claim was sustained for "the method of, and apparatus for, transmitting vocal and other sounds telegraphically . . . by causing electrical undulations, similar in form to the vibrations of the air accompanying the

said vocal or other sounds, substantially as set forth." The case of *O'Reilly* v. *Morse* was again commented on and distinguished, Mr. Chief Justice Waite remarking: "In the present case the claim is not for the use of a current of electricity in its natural state as it comes from the battery, but for putting a continuous current in a closed circuit into a certain specified condition suited to the transmission of vocal and other sounds, and using it in that condition for that purpose. . . . We see nothing in Morse's case to defeat Bell's claim; on the contrary, it is in all respects sustained by that authority. It may be that electricity cannot be used at all for the transmission of speech except in the way Bell has discovered, and that therefore, practically, his patent gives him its exclusive use for that purpose, but that does not make his claim one for the use of electricity distinct from the particular process with which it is connected in his patent." See also *Am. Bell Telephone Co.* v. *Dolbear*, 15 Fed. Rep. 448. It will be observed that, in all these cases, the process was either a chemical one, or consisted in the use of one of the agencies of nature for a practical purpose.

It is equally clear, however, that a valid patent cannot be obtained for a process which involves nothing more than the operation of a piece of mechanism, or, in other words, for the function of a machine. The distinction between the two classes of cases nowhere better appears than in the earliest reported case upon that subject, viz., *Wyeth* v. *Stone*, 1 Story, 273, in which the patentee claimed as his invention the cutting of ice of a uniform size by means of an apparatus worked by any other power than human. This was said to be a claim for an art or principle in the abstract, and not for any particular method or machinery by which ice was to be cut, and to be unmaintainable in point of law, although the patent was held to be good for the machinery described in the specification.

The leading case in this court is that of *Corning* v. *Burden*, 15 How. 252, 267, decided at the same term with that of *O'Reilly* v. *Morse*. The patent was for a new and useful machine for rolling puddler's balls and other masses of iron,

in the manufacture of iron. Upon the trial the court below charged the jury that the patent was for a new process, mode, or method for converting puddler's balls into blooms by continuous pressure and rotation of the balls between converging surfaces. Upon appeal to this court, however, the patent was held to be one for a machine, and, in delivering the opinion of the court, Mr. Justice Grier stated with great clearness the difference between such processes as were patentable and such as involved merely mechanical operation. "A process *eo nomine* is not made the subject of a patent in our act of Congress. It is included under the general term 'useful art.' An art may require one or more processes or machines in order to produce a certain result or manufacture. The term 'machine' includes every mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result. But where the result or effect is produced by chemical action, by the operation or application of some element or power of nature, or of one substance to another, such modes, methods, or operations are called processes. A new process is usually the result of discovery; a machine, of invention. The arts of tanning, dyeing, making water-proof cloth, vulcanizing india rubber, smelting ores, and numerous others are usually carried on by processes, as distinguished from machines. One may discover a new and useful improvement in the process of tanning, dyeing, etc., irrespective of any particular form of machinery or mechanical device. And another may invent a labor-saving machine, by which this operation or process may be performed, and each may be entitled to his patent. . . . It is when the term process is used to represent the means or method of producing a result that it is patentable, and it will include all methods or means which are not effected by mechanism or mechanical combinations. But the term process is often used in a more vague sense, in which it cannot be the subject of a patent. Thus we say that a board is undergoing the process of being planed, grain of being ground, iron of being hammered or rolled. Here the term is used subjectively or passively as applied to the material operated on, and not to the method or mode of

producing that operation, which is by mechanical means, and the use of a machine, as distinguished from a process. In this use of the term it represents the function of a machine, or the effect produced by it on the material subjected to the action of the machine. But it is well settled that a man cannot have a patent for the function or abstract effect of a machine, but only for the machine which produces it."

Although the cases are not numerous, this distinction between a process and a function has never been departed from by this court, and has been accepted and applied in a large number of cases in the Circuit Courts. The following processes have been held not to be patentable: An improvement in sewing machines, by which the soles and uppers of boots and shoes could be sewed together without any welt by a certain kind of stitches, *McKay* v. *Jackman*, 12 Fed. Rep. 615. A process for washing shavings in breweries, *Brainard* v. *Cramme*, 12 Fed. Rep. 621. For an improved method of treating seed by steam, *Gage* v. *Kellogg*, 23 Fed. Rep. 891. A process for crimping heel stiffenings of boots and shoes, *Hatch* v. *Moffitt*, 15 Fed. Rep. 252. See also *Sickels* v. *Falls Company*, 4 Blatchford, 508; *Excelsior Needle Co.* v. *Union Needle Co.*, 32 Fed. Rep. 221.

The patent in question clearly falls within this category. As already shown, it is upon its face "for an improved process of manufacture," and mechanism is shown and described simply for the purpose of exhibiting its operation, which is described in detail. The result is a pulley more perfectly balanced, more faultless in shape, stronger and more durable, perhaps, than any before produced; but this was not because the patentee had discovered anything new in the result produced, but because the mechanism was better adapted to produce that result than anything that had before been known. As pulleys of that description had been produced before, doubtless, with greater care in the manufacture of them, a pulley as perfect as his might have been made. So that all that he invented in fact was a machine for the more perfect manufacture of such pulleys. The operation or function of such machine, however, is not patentable as a process.

2. Patent No. 248,598, granted upon the same day, is obviously, though not in so many words, for the product of the mechanical process described in the patent just disposed of — in other words, for a belt pulley made substantially in the manner detailed in that patent. In his specification the patentee states that his invention "consists in a pulley which is perfectly true and accurately balanced — that is, a pulley in which the centre of gravity and geometrical centre or axis coincide." He further states that all the prior belt pulleys had been open to the objection of not having been accurately balanced, a defect inherent in their structure. "Thus, while cast pulleys are of accurate shape, they cannot be practically produced of perfect balance, owing to the irregularity of the weight of the metal at different portions of the rim, and to contraction in cooling; and where pulleys of similar character to that herein shown have been made, the spiders have not been properly prepared — that is, the spiders have not been operated upon so as to make the ends of their arms exactly concentric with the true centre or axis of the pulley. . . . The spider, however made, will be slightly imperfect in shape, and unless the irregularities are cured before applying the rim, the completed pulley will not be accurately balanced."

After detailing the advantages of having the pulleys perfectly balanced and shaped with absolute accuracy, and setting forth in general terms the manner of securing this by grinding the rim concentrically with the axis, he claims, first, "the improved belt pulley, herein described, having the ends of the spider arms ground off concentrically with the axis of the pulley;" and second, the same pulley with the rim and the ends of the spider arm ground off concentrically.

Obviously the patent in question is not for a new device, nor for a new combination of old devices. It contains precisely the elements of every other belt pulley, and operates in substantially the same way. It is in reality a patent for a belt pulley which differs from other belt pulleys only in the fact that the rim and ends of the spider arms are ground off concentrically with the axis. Obviously this is not a patentable feature. The claims state in substance that the belt

pulley must be made in a peculiar way, which is equivalent to saying that it must be made by a peculiar process; in other words, that it is a product of a mechanical process, which we have already held not to be patentable. The only object in having the ends of the spider arms ground off concentrically with the axis of the pulley is that the rim may be concentric with such axis. This, however, is necessary in every pulley, and if the patented pulley be superior to others in this particular, it is because its workmanship is superior, and because it is made so by a superior process of manufacture. The specification states in substance that this belt pulley is superior to every other because it is better made, more perfectly balanced, and is one in which the centre of gravity and geometrical centre, or axis, coincide. It is said that such perfection of balance can only be obtained by the process described in the prior patent, viz., by grinding off the ends of the spider arms; but it does not follow that some other person may not, by another process, or by greater care or superior skill or deftness in the handling of tools, manufacture a pulley which shall be equal to this. But if this patent be valid, he would be an infringer in so doing, though he employed no mechanism whatever in the manufacture of such pulley, and did the work entirely with his own hands, if only he ground off the ends of the spider arms.

In short, this is a patent only for superior workmanship, and within all the authorities is invalid. This court has repeatedly stated that all improvement is not invention. If a certain device differs from what precedes it only in superiority of finish, or in greater accuracy of detail, it is but the carrying forward of an old idea, and does not amount to invention. Thus, if it had been customary to make an article of unpolished metal, it does not involve invention to polish it. If a telescope had been made with a certain degree of power, it involves no invention to make one which differs from the other only in its having greater power. If boards had heretofore been planed by hand, a board better planed by machinery would not be patentable, although in all these cases the machinery itself may be patentable.

Thus in *Smith* v. *Nichols*, 21 Wall. 112, 119, the subject-matter of the patent was an elastic woven fabric, and it appeared that, owing to the excellent manner of weaving, and perhaps from other causes, the fabric had gone into extensive use, and, for the especial purpose of elastic gores in gaiter-boots, had supplanted every other similar fabric. It appeared, however, that a fabric substantially the same in construction and possessing virtually the same properties had been previously known and used, and that the superiority of the fabric patented was due solely to improved machinery or to greater mechanical skill in the formation of the fabric, by which an excellence in degree was obtained, but not one in kind. In delivering the opinion Mr. Justice Swayne observed: "All the particulars claimed by the complainant, if conceded to be his, are within the category of *degree*. Many textile fabrics, especially those of cotton and wool, are constantly improved. Sometimes the improvement is due to the skill of the workmen, and sometimes to the perfection of the machinery employed. The results are higher finish, greater beauty of surface, and increased commercial value. A patent for the better fabric in such cases would, we apprehend, be unprecedented."

In *Pickering* v. *McCullough*, 104 U. S. 310, the patent was for an improvement in the manufacture of moulding crucibles and pots, made of a plastic material composed of black lead and fire clay. It appeared that difficulty had been experienced in removing the crucibles from the mould, in consequence of the adhesive nature of the black-lead mixture employed in the manufacture. The invention obviated this difficulty, and by an improved mode of manufacture much labor and expense were saved, and crucibles were produced which were superior to those made by any particular mode known prior to the device in question. It was held that this did not involve invention.

So in *Burt* v. *Evory*, 133 U. S. 349, the invention consisted in a novel mode of constructing shoes and gaiters, whereby the ordinary elastic goring at the sides and lacing at the front were both dispensed with. The claim was treated as one for

a manufactured article and not for a mode of producing it. It was held that the changes made "were changes of degree only, and did not involve any new principle. Their shoe performed no new function. In the construction of the vamp, the quarters and the expansible gore flap were cut somewhat differently, it is true, from like parts of the shoe constructed under the earlier patents referred to, but they subserved the same purposes." See also *Wooster* v. *Calhoun*, 11 Blatchford, 215.

3. Patent No. 238,702, also for belt pulley, antedated the other patents by seven months, and as stated by the patentee has for its object, first, the production of a cheap, light, and durable pulley; and secondly, the production of irregular sizes of pulleys without the necessity of a separate pattern for each size of pulley required. This invention consists, first, in constructing the usual crown or dish on the rim of wrought-metal rimmed pulleys by bending said rim transversely during the process of manufacture; secondly, the belt pulley having arms formed of wood, preferably of a cylindrical shape, which at their inner ends rest in sockets cast on the hub, and at their outer ends are provided with bracket lugs, to which the pin is secured by rivets or other equivalent means.

"The rim D may be of any suitable material — either wrought iron, steel, or wood — with the bracket lugs C arranged transversely, as shown, in order to brace and support the edges of the rim and prevent the same from working loose from its attachment, which is liable to occur when the bracket lugs are not arranged as above set forth.

"The crown or dish *d*, usual to belt pulleys, is formed on the rim D by bending or dishing the rim during the process of manufacture, preferably at the same time and by means of the same rolls that bend the rim into the required circular shape. By the use of wood for forming the arms of the pulley, as above set forth, a much lighter and cheaper pulley can be produced than where iron is used for said arms and yet possess as great strength."

The claims are as follows:

"1. A wrought-metal rimmed pulley having a crown, *d*,

formed on its rim during the process of manufacture, as described, and for the purpose set forth.

"2. A belt pulley provided with wooden arms B, a cast-metal hub A, having radial sockets *a* and bracket lugs C, for the attachment of the rim D, as described, and for the purpose set forth."

If, as stated in the specification, it had been "usual" heretofore to form the rim with a crown or dish it makes no difference, so far as the completed article is concerned, whether it be formed during the process of manufacture by bending the rim transversely, or in any other way. Indeed, it is difficult to see how the crown could be made except during the process of manufacture, as it is part of such process. We are dealing with a belt pulley as a new article of manufacture, and the question how the pulley is made, or how the crown is made upon the rim, is entirely immaterial. As the first claim does not describe a pulley which differs at all in its completed state from prior pulleys, it is clearly invalid.

The second claim is for a belt pulley provided with wooden arms and a cast-iron hub with sockets and bracket lugs, for the attachment of the rim. But as this claim was not found by the court below to have been infringed, it is not necessary to consider it.

For the reasons above given we think all these patents are invalid, and that the demurrer to the bill should have been sustained, except perhaps so far as the second claim of the last patent is concerned.

Medart may or may not have been entitled to a patent for the machinery employed in the manufacture of the belt pulleys in question; but he certainly was not entitled to a patent for the function of such machine, nor to the completed pulley, which differed from the prior ones only in its superior workmanship.

The decree of the court below must, therefore, be

*Reversed, and the case remanded to the Circuit Court with directions to dismiss the bill.*